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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
KANG, INSUN	

ART UNIT	PAPER NUMBER
2124	

DATE MAILED: 10/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/732,342	SANGAVARAPU ET AL.
	Examiner	Art Unit
	Insun Kang	2124

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 June 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the amendment filed 6/23/2004.

2. As per applicant's request, claims 2,5, 22, 25, 32, 39, and 46 have been amended. Claims 1-51 are pending in the application.

Specification

3. The objection to the abstract and specification has been withdrawn due to the amendment to the Specification.

Claim Objections

4. Claims 1-10, 18-20, and 28-30 are objected to because of the following informalities: Per claim 1, the phrase "after being read into memory" needs to be corrected as "after said page is read into memory" for clarification. In claim 5, "is" needs to be deleted. Per claims 8, 18, and 28, the claims recite "the step of identifying." The word "detecting" needs to be used for consistency in connection with the parent claims 1, 11, and 21. As per claims 2-10, 19, 20, 29, and 30, these claims are objected for dependency on the above objected parent claims 1, 18, and 28. Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-51 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Per claim 1, it is unclear as to which global breakpoint in lines 5 and 7 they are referring. They are interpreted as "the global breakpoint."

Per claim 11, it is unclear as to which global breakpoint in line 7 and 9 they are referring. They are interpreted as "the global breakpoint."

In claim 15, the term "adapted to" is unclear. It has been held that the recitation that an element is "adapted to" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138. Correction is required.

Per claim 21, it is unclear as to which global breakpoint in line 7 and 10 they are referring. They are interpreted as "the global breakpoint."

Per claims 2, 12, 22, 31, 32, 34, 38, 39, 41, 45, 46, and 48, it is unclear as to which global breakpoint in line 6 (claim 31), 2 (claim 34, 41, 48), 8 (claim 38), 3 (claim 39), 7 (claim 45), 4(claim 46), and 3 (claims 2, 12, 22, and 32) it is referring. It is interpreted as "the global breakpoint."

As per claims 2-10, 12-20, 22-30, 32-37, 39-44, and 46-51, these claims are rejected for dependency on the above rejected parent claims, 1, 11, 21, 31, 38, and 45.

Claim Rejections - 35 USC § 101

7. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

8. Claims 1-10 and 31-37 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1-10 and 31-37 are non-statutory because they are directed to a "method" without recitation of a computer or a computer-readable medium embodying the method. The claims merely recite a "method" that is disembodied arrangement so as to be called a "computer program" or compilation of facts, information, or data *per se*, without creating any functional interrelationship, either as part of the stored data or as part of the computing processes performed by the computer ("acts") or computer readable medium so as to enable the computer to perform the claimed steps of inserting/removing a global breakpoint, reading said page into memory, etc as recited. Thus the claims represent non-functional descriptive material that is not capable of producing a useful result, and hence represent only abstract ideas. Therefore, the claims are non-statutory.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

10. Claims 1-51 are rejected under 35 U.S.C. 102(a) as being anticipated by Moore (Dynamic Probes and Generalised Kernel Hooks Interface for Linux, 10/2000).

Per claim 31:

Moore discloses:

- removing a global breakpoint in a page containing software code if said page containing said global breakpoint is present in memory ("Re-inserting probes when

a page of code is brought back into memory after having been discarded. Removal of a probe...we use an instruction-replacement form of breakpoint, which requires us to restore the original instruction in a similar manner to insertion by means of an alias address," page 5 first paragraph; "Both would have needed an ability to place global breakpoints at certain code locations and at the same time exercise conditional logic...However, the breakpoints deployed require performance to be maintained...Other uses of Dprobes has been to provide a high-speed conditional breakpoint facility which gives control to a kernel debugger when the correct situation presents itself," page 20 Conclusions section)

- detecting a private copy of said page if present, reading said page into memory if not present in memory, and removing a global breakpoint in said private copy ("When probes are registered for the first time we register the readpage filter routine for the module. This allows us to be able to re-insert probes when discarded pages are reloaded into memory. This probe insertion technique avoids changing the page state and avoids breaking of multiple copies of swappable pages which would happen if we were merely to store into the virtual address. Re-inserting probes when a page of code is brought back into memory after having been discarded. Removal of a probe...we use an instruction-replacement form of breakpoint, which requires us to restore the original instruction in a similar manner to insertion by means of an alias address," page 5 first paragraph) as claimed.

Per claim 32:

The rejection of claim 31 is incorporated, and further, Moore discloses:

- providing a readpage process for reading said page into memory and for removing a global breakpoint in said page immediately after being read into memory ("When probes are registered for the first time we register the readpage filter routine for the module. This allows us to be able to re-insert probes when discarded pages are reloaded into memory. This probe insertion technique avoids changing the page state and avoids breaking of multiple copies of swappable pages which would happen if we were merely to store into the virtual address," page 5 first paragraph) as claimed.

Per claim 33:

The rejection of claim 32 is incorporated, and further, Moore discloses:

-said readpage process is implemented as a kernel routine that is called when said page is loaded into memory ("When probes are registered for the first time we register the readpage filter routine for the module. This allows us to be able to re-insert probes when discarded pages are reloaded into memory. This probe insertion technique avoids changing the page state and avoids breaking of multiple copies of swappable pages which would happen if we were merely to store into the virtual address," page 5 first paragraph) as claimed

Per claim 34:

The rejection of claim 31 is incorporated, and further, Moore discloses:

- turning off an operation set up earlier for inserting a global breakpoint in said page when said page is read into memory ("When probes are registered for the first time we register the readpage filter routine for the module. This allows us to be able to re-insert probes when discarded pages are reloaded into memory. This probe insertion technique avoids changing the page state and avoids breaking of multiple copies of swappable pages which would happen if we were merely to store into the virtual address," page 5 first paragraph) as claimed.

Per claim 35:

The rejection of claim 31 is incorporated, and further, Moore discloses:

- identifying said global breakpoint using an identifier of a file and an offset in said file ("The probe record contains the location of the probe, maintained as file inode-offset pair," page 5 first paragraph) as claimed.

Per claim 36:

The rejection of claim 35 is incorporated, and further, Moore discloses:

- said file identifier is an inode ("The probe record contains the location of the probe, maintained as file inode-offset pair," page 5 first paragraph) as claimed.

Per claim 37:

The rejection of claim 35 is incorporated, and further, Moore discloses:

-determining if said page is present in memory using a lookup table based on said file identifier and said offset (""Pre-building is made possible because the probe location

may be expressed symbolically using symbols from the module's symbol table," page 7 second paragraph; "page tables," page 17 first and second paragraphs) as claimed.

Per claims 1-3 and 8-10:

These claims address the steps of insertion of a global breakpoint. Moore recites the insertion steps recited in claims 1-3 and 8-10 in pages 1-5. Also, the steps of insertion are inherently included in claims 31-37 as the insertion steps have to be performed first for the removal steps. The applicant does not contend that claims 31-37 are distinct from the group 1-10. Accordingly, the examiner considers these two groups address the same subject matter. Therefore, these claims are another version of the claimed method discussed in claims 31-37, wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above.

Per claim 4:

The rejection of claim 2 is incorporated, and further, Moore discloses:

- setting up an operation to insert said global breakpoint in said page immediately after said page is read into memory by an operating system, if said page is not already in memory ("The probe insertion technique has been improved by delaying the physical insertion of probes in a page of an executable until the time that page is brought into memory on demand," page 3 second paragraph; "Probes are inserted whenever a page whining a probed module is loaded into memory," page 5) as

claimed.

Per claim 5:

The rejection of claim 4 is incorporated, and further, Moore discloses:

- said readpage process comprises changing a file specific readpage process to a wrapper routine that invokes an original readpage process and then performs said operation required ("readpage filter routine for the module. This allows us to be able to re-insert probes when discarded pages are reloaded into memory," page 5) as claimed.

Per claim 6:

The rejection of claim 1 is incorporated, and further, Moore discloses:

- swapping said copy to a swap device after inserting said global breakpoint in said copy ("We also cater for pages marked Copy-on-Write and of a shared module that might be loaded at different virtual addresses in different processes...This probe insertion technique avoids changing the page state and avoids breaking of multiple copies of swappable pages which would happen if we were merely to store into the virtual address," page 5) as claimed.

Per claim 7:

The rejection of claim 6 is incorporated, and further, Moore discloses:

-marking said copy as dirty after inserting said global breakpoint in said copy, whereby when swapping said copy to said swap device, said global breakpoint being present in said swapped copy ("We also cater for pages marked Copy-on-Write and of a shared module that might be loaded at different virtual addresses in different processes...This probe insertion technique avoids changing the page state and avoids breaking of multiple copies of swappable pages which would happen if we were merely to store into the virtual address," page 5) as claimed.

Per claims 11-20, they are the computer-implemented apparatus versions of claims 1-10, respectively, and are rejected for the same reasons set forth in connection with the rejection of claims 1-10 above.

Per claims 21-30, they are the computer program product versions of claims 1-10, respectively, and are rejected for the same reasons set forth in connection with the rejection of claims 1-10 above.

Per claims 38-44, they are the computer-implemented apparatus versions of claims 31-37, respectively, and are rejected for the same reasons set forth in connection with the rejection of claims 31-37 above.

Per claims 45-51, they are the computer program product versions of claims 31-37, respectively, and are rejected for the same reasons set forth in connection with the rejection of claims 31-37 above.

Response to Arguments

11. Applicant's arguments with respect to claims 1-51 have been considered but are moot in view of the new ground(s) of rejection. Therefore, this action is made non-final.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Insun Kang whose telephone number is 703-305-6465. The examiner can normally be reached on M-F 8:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kakali Chaki can be reached on 703-305-9662. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

IK
10/1/2004

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